Welcome to your
Hampton/NASA Steam Plant

Keeping Hampton Green…with Steam!

OUR MISSION

To provide municipal solid waste disposal for the City of Hampton and energy for NASA Langley Research Center in an environmentally safe and economical manner.

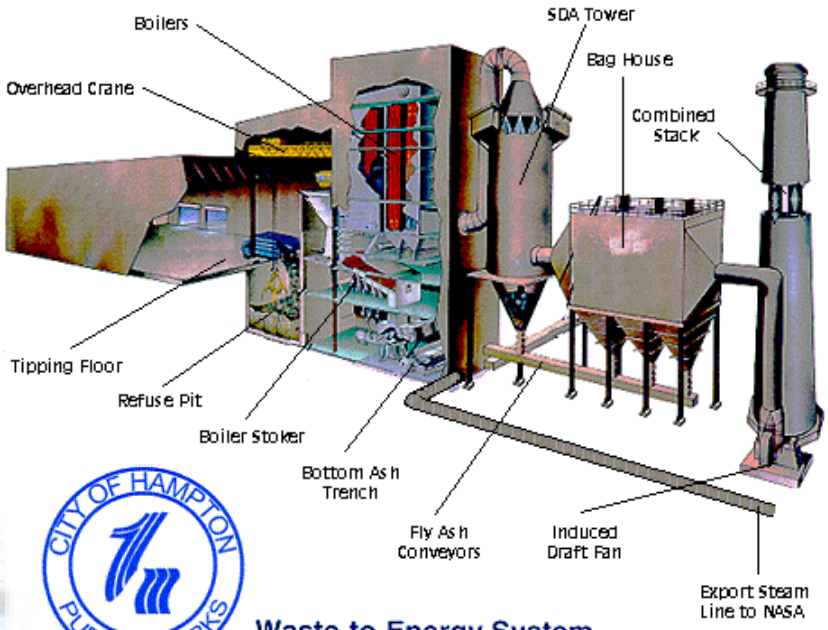
OUR HISTORY

Hold on, Herodotus—we've only been around since 1980. Still, we've managed to make our mark.

Completed under a unique partnership with the federal government, this cutting-edge facility serves Hampton, Poquoson, five federal installations, law enforcement agencies, and the private sector.

We have hosted representatives from Brazil, Iceland, Japan, the Ukraine, and other countries interested in exploring waste to energy technology for their communities.

We've also won a lot of awards – like HRSD's Diamond Excellence Award for perfect compliance and the Department of Energy's prestigious Federal Energy and Water Management Award.



Waste-to-Energy System

The Process

Every day municipal solid waste (MSW) trucks arrive on our enclosed tipping floor. They all dump into the refuse pit while the crane operator makes a preliminary inspection from his overhead vantage point. He moves the trash into neat pyramids, periodically feeds the boilers, and occasionally removes oversized or unburnable items.

The crane deposits the refuse into the feed chute where it falls to the stoker. The stoker is like a travelling floor that moves the trash through the boiler as it burns. At the end of the stoker, any remaining "bottom ash" is dropped into a water filled trench where it is quenched and carried out by conveyors. From there, it is screened for size while a magnet removes the ferrous metal for recycling.

The boiler is actually a group of drums (large tanks), headers (long small tanks), and hundreds of tubes hanging from supports 65 feet in the air. It transfers the heat of combustion to the 5,255 gallons of water in its tubes at the top and along the walls. Steam forms in the tubes and makes its way up to the steam drum. The 365 psi, 440°F steam is then exported by pipes and valves to NASA for use.

The gases given off by the combustion process are piped to the Spray Dry Adsorber (SDA) Tower where a fine mist of lime slurry is sprayed to reduce any acid content and lower the temperature. The exhaust gases are then directed to the bag house where they are filtered by very fine mesh bags. The scrubbed and filtered exhaust is then drawn to the stack by the induced draft fans, carried 248 feet in the air, and released into the atmosphere. The particles that drop out of the exhaust stream in the SDA and bag house are called "fly ash" and are carried away by conveyor. This process continuously maintains strict environmental compliance using a sophisticated program and numerous monitors.

Fly ash and bottom ash combine and are again treated with lime. This is our residue ash and it can be used as sanitary top cover at the Bethel Landfill.

Where We Fit in the Waste Stream

The EPA is committed to Waste-to-Energy as part of its goals:

Reduce: the United States is the single largest consumer on the planet. We are also one of the largest producers of waste. Think before you buy. Do your best to try to consume less and at the same time look for ways to waste less; e.g., packaging material, printing, junk mail, etc.

Reuse: are you sure you have to throw it away? Maybe there's still some life left in it after all, or if you're sure you can't use it, maybe some one else can. Ask, sell, or donate.

Recycle: curbside recycling diverts much of the usable waste, but depends on you to sift and sort before you throw. Take the time—it's worth it on so many levels.

Recover: **this is us. As a major part of the City's integrated approach to managing solid waste, we directly recover the stored energy inherent in refuse. By burning it, we release that energy and convert it to usable steam. Our steam is used directly by NASA, but many other WTE Plants all over the world have been adapted to generate reliable base load electricity with high efficiency turbines.**

Dispose: if there isn't any way to take care of it in the alternatives above (or after it has been processed through the Plant); then it can be taken to the landfill.

The Results

NASA receives affordable energy for its research while conserving fossil fuel at the same time. The City's refuse is fully processed in six days; minimizing growth time for pathogens and spores. Odors are effectively controlled by storing the refuse in an enclosed area with tipping floor ventilation being injected into the furnace to destroy organic vapors. MSW residue ash is rendered inert, generates no landfill gases, and takes up one-tenth the space of raw refuse; greatly extending the lifespan of our landfill.

A Win-Win Situation for Everyone!

Number Crunching

Step Up

Recycling and Waste to Energy are not mutually exclusive and can co-exist quite peacefully. You may have heard the phrase "Zero Waste," and while an admirable goal, it is not entirely practical. Let's take a look.

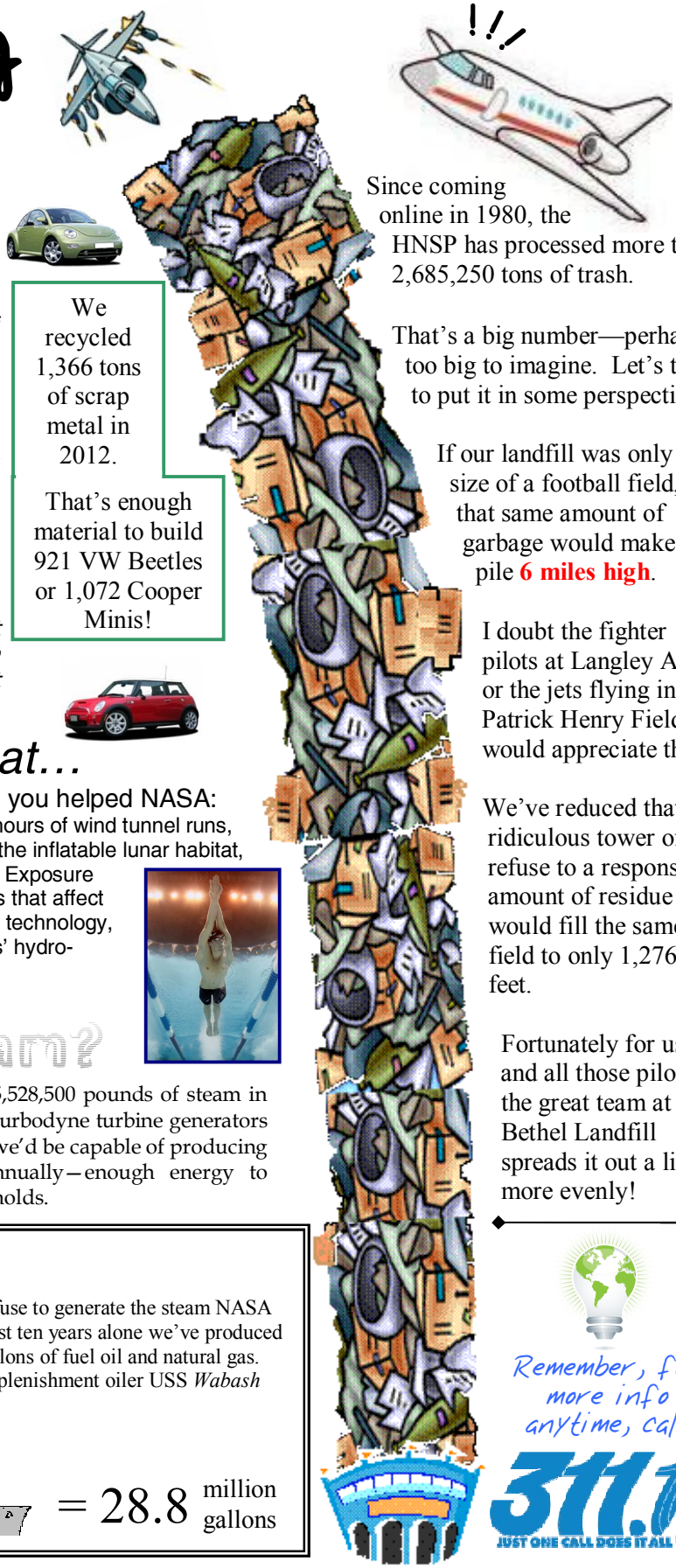
According to the EPA, each of us produces 4.4 pounds of trash a day. That comes to 1,606 lbs per year.

Out of the typical waste stream, 60-75% of the material is recyclable in some way. Since advocating recycling in 1970, we currently average between 28-33%, depending on location. Some communities in Canada have attained 50% and the EPA has set a goal of 40% for the US by 2011.

So, even by Canadian standards, we would still have to deal with 803 lbs of trash per person every year.

That's plenty left over for us to recover.

By the way, recycling also helps us here at the Plant. Incinerating batteries, for example, releases harmful gases, acids, and heavy metals. As you read, we treat our exhaust and ash, but just taking these ordinary objects out of the waste stream would save us thousands of dollars in treatment chemicals and be more environmentally healthy.



We recycled 1,366 tons of scrap metal in 2012.

That's enough material to build 921 VW Beetles or 1,072 Cooper Minis!

Since coming online in 1980, the HNSP has processed more than 2,685,250 tons of trash.

That's a big number—perhaps too big to imagine. Let's try to put it in some perspective.

If our landfill was only the size of a football field, that same amount of garbage would make a pile **6 miles high**.

I doubt the fighter pilots at Langley AFB or the jets flying in to Patrick Henry Field would appreciate that!

We've reduced that ridiculous tower of refuse to a responsible amount of residue that would fill the same field to only 1,276 feet.

Fortunately for us, and all those pilots, the great team at the Bethel Landfill spreads it out a little more evenly!

Did You Realize That…

If you threw any trash away in Hampton since 1980, you helped NASA: Explore Mars, test space shuttle aerodynamics in over 60,000 hours of wind tunnel runs, develop the record setting Mach 9.6 X-43A scramjet, construct the inflatable lunar habitat, conduct over 50 space-borne experiments in the Long Duration Exposure Facility (LDEF), design CALIPSO to study atmospheric aerosols that affect global climate change, reduce dangerous wake vortices in wing technology, and even perfect 14-time Olympic gold medalist Michael Phelps' hydro-dynamic Speedos for Beijing.

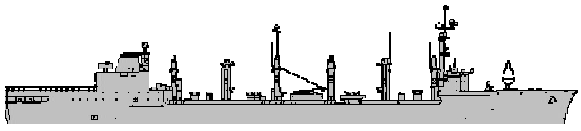
Got Steam?

We've got plenty. In fact, we generated 495,528,500 pounds of steam in 2012 alone. If we used, say, a couple small Turbodyne turbine generators instead of sending our raw steam to NASA, we'd be capable of producing 16.5 million kilowatt hours of power annually—enough energy to conservatively supply 1,467 Hampton households.

Got Gas?

Well, keep it to yourself. Seriously though, if we didn't burn refuse to generate the steam NASA needs, they'd have to burn more traditional fuel to get it. Over the past ten years alone we've produced enough refuse generated steam to save the planet 29.9 **MILLION** gallons of fuel oil and natural gas.

That's more fuel than the 659 foot long, 40,100 ton US Navy replenishment oiler USS *Wabash* **and three of her sisters** could carry in cargo.

4 x  = 28.8 million gallons

Remember, for more info anytime, call:

311 JUST ONE CALL DOES IT ALL

See for yourself:

To see how you can help recycle various batteries locally, go to http://www.rbrc.org/consumer/ or visit http://earth911.com/electronics/ to see how to recycle a wide variety of home electronics.
For more ideas on how to recycle, see http://kids.niehs.nih.gov/recycle.htm
Check out your carbon footprint at http://michaelbluejay.com/electricity/carboncalculator.html
See what NASA LaRC is up to at http://www.nasa.gov/centers/langley/home/index.html